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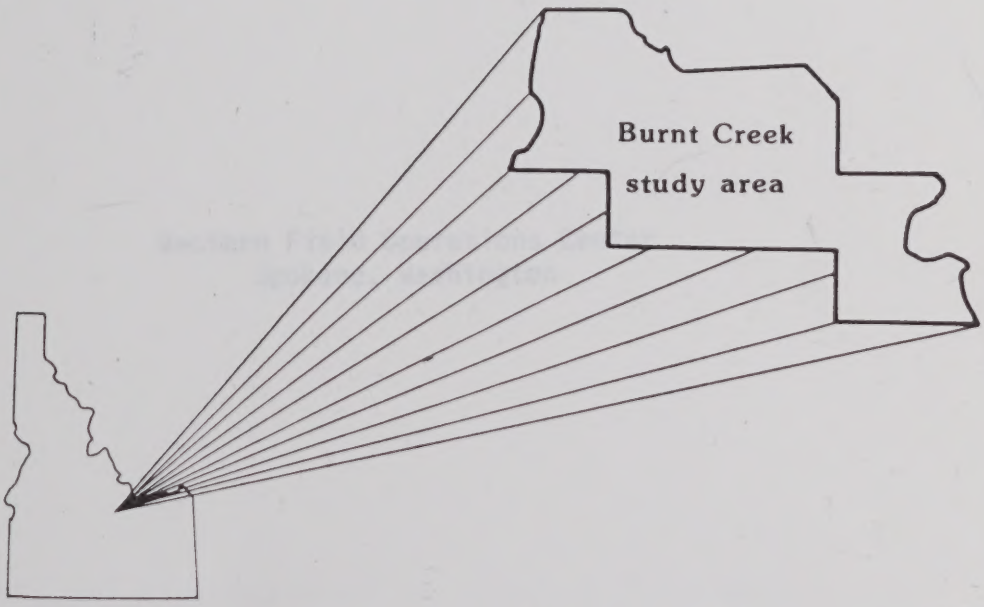
Mineral Resources of the Burnt Creek Study Area, Custer County, Idaho



BUREAU OF MINES

UNITED STATES DEPARTMENT OF THE INTERIOR

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MINERAL RESOURCES OF THE BURNT CREEK STUDY AREA, CUSTER COUNTY, IDAHO

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By
Peter N. Gabby

Western Field Operations Center
Spokane, Washington

UNITED STATES DEPARTMENT OF THE INTERIOR
Donald P. Hodel, Secretary

BUREAU OF MINES
Robert C. Horton, Director

PREFACE

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on U.S. Bureau of Land Management administered land designated as Wilderness Study Areas ". . . to determine the mineral values, if any, that may be present . . . ." Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a Bureau of Mines mineral survey of part of the Burnt Creek Wilderness Study Area (ID-45-12), Custer County, ID.

This open-file report will be summarized in a joint report published by the U.S. Geological Survey. The data were gathered and interpreted by Bureau of Mines personnel from Western Field Operations Center, E. 360 Third Avenue, Spokane, WA 99202. The report has been edited by members of the Branch of Mineral Land Assessment at the field center and reviewed at the Division of Mineral Land Assessment, Washington, DC.

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SUMMARY

A mineral survey of 8,300 acres of the 24,980-acre Burnt Creek Wilderness Study Area (ID 45-12), was conducted by the U.S. Bureau of Mines in 1985 at the request of the Bureau of Land Management. The study area is located in Custer County, ID, 90 miles northwest of Idaho Falls. No mines, claims, or prospects are in the study area. The northern half of the study area and adjacent lands to the north, northeast, and east are or were recently under oil and gas lease.

Basalt and latite-andesite of the Challis Volcanics predominate in the study area. Several hundred feet east of the study area is a quarry in talus of Mississippian-age limestone that was used for sized 100-pound rock fill in the old Dry Creek Reservoir dam. Two samples, one taken at the quarry and the other at a limestone outcrop on East Fork Burnt Creek, have $CaCO_3$ content in the range of 90 to 95 percent, and is suitable as the limestone component of Portland cement. However, limestone outside the study area could supply foreseeable demand. Lead-silver mineralization has been observed in Paleozoic carbonate rocks elsewhere in the Lost River Range, but these rocks do not occur in the study area.

INTRODUCTION

This report describes the USBM (U.S. Bureau of Mines) portion of a cooperative study with the USGS (U.S. Geological Survey) to evaluate mineral resources and potential of the Burnt Creek study area at the request of the BLM (U.S. Bureau of Land Management). The USBM examines individual mines, prospects, claims, and mineralized zones, and evaluates identified mineral and energy resources. The USGS evaluates potential for undiscovered resources based on areal geological, geochemical, and geophysical surveys. The USBM and USGS results are summarized in a joint report used to determine the suitability of the study area for inclusion into the National Wilderness Preservation System. The immediate goal of this report is to provide data for the President, Congress, the BLM, and the general public for land-use decisions. The long-term objective of this and other USBM studies is to help ensure that the Nation has an adequate and dependable supply of minerals at reasonable cost.

Setting

The study area is 90 mi (mile) northwest of Idaho Falls, ID. Access is by dirt roads. From the northwest corner, on Burnt Creek, it is a 62 mi drive to Challis, and from the east side at the old Dry Creek Reservoir dam site, it is 36 mi to Mackay (fig. 1). The study area adjoins the Borah Peak study area, which is administered by the U.S. Forest Service and which was studied concurrently by the USBM (Capstick and Mayerle, 1986).

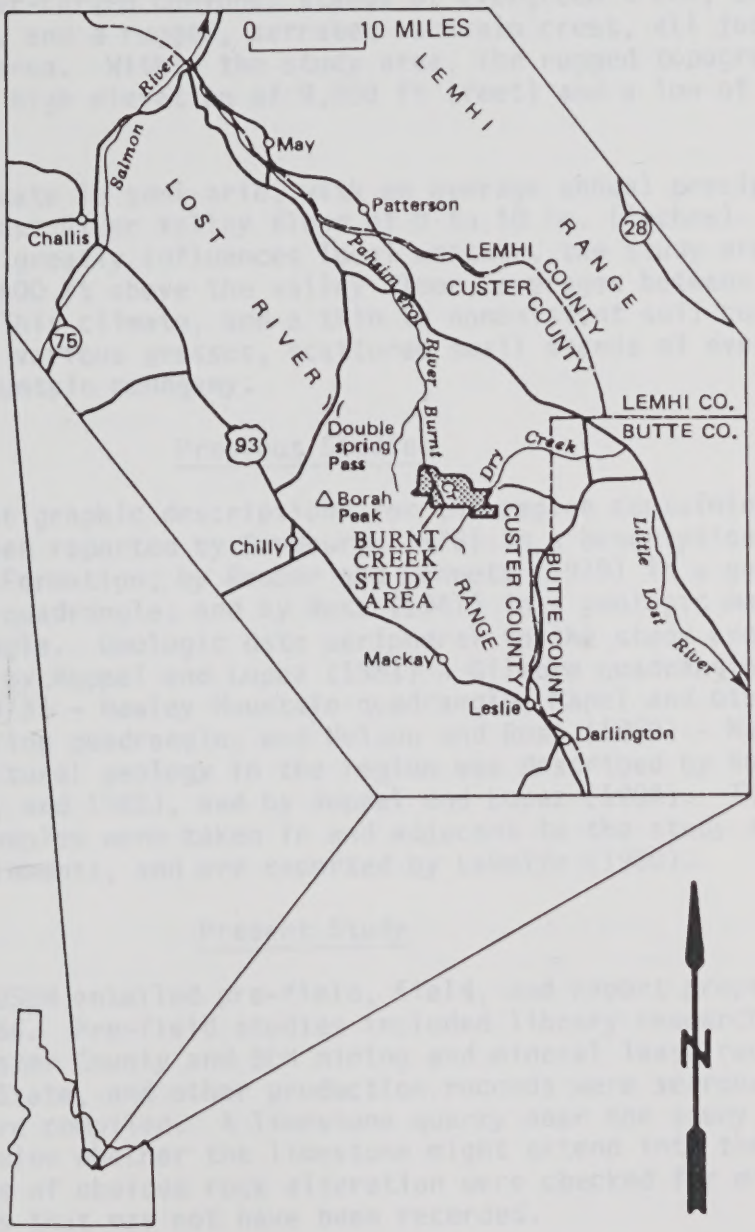

FIGURE 1. – Location of the Burnt Creek study area, Custer County, ID.

A part of the 24,980-acre Burnt Creek Wilderness Study Area 1/, the Burnt Creek study area encompasses 8,300 acres of deeply-cut drainages and high ridges on the low northeast slope of the Lost River Range in east-central Idaho. The Lost River Range, containing the highest peak (12,662-ft Borah Peak) and the only alpine glacier in Idaho, is dominated by U-shaped, glacier-carved canyons, stands of evergreen trees, cirque walls, snow fields, and a rugged, serrated mountain crest, all just outside the study area. Within the study area, the rugged topography is characterized by a high elevation of 9,808 ft (feet) and a low of 7,450 ft.

The local climate is semi-arid, with an average annual precipitation along the Little Lost River Valley floor of 9 to 10 in. (inches). But because topography greatly influences local weather, the study area, being well over 1,400 ft above the valley floor, averages between 16 and 20 in. per year. This climate, and a thin to nonexistent soil cover support sagebrush, various grasses, scattered small stands of evergreen trees, and some mountain mahogany.

Previous Studies

Rock and stratigraphic descriptions for the region containing the study area have been reported by Sandburg (1975) in a description of the McGowan Creek Formation; by Rember and Bennett (1979) in a geologic map of the Dubois quadrangle; and by Ross (1947) in a geologic map of the Borah Peak quadrangle. Geologic data peripheral to the study area was gleaned from maps by Ruppel and Lopez (1981) - Gilmore quadrangle; Mapel and Shropshire (1973) - Hawley Mountain quadrangle; Mapel and others (1965) - Doublespring quadrangle; and Nelson and Ross (1969) - Mackay quadrangle. Structural geology in the region was described by Ruppel (1964, 1967, 1978, and 1982), and by Ruppel and Lopez (1984). Thirteen stream sediment samples were taken in and adjacent to the study area, analyzed for 46 elements, and are reported by LaDelfe (1980).

Present Study

Work by the USBM entailed pre-field, field, and report preparation phases in 1985-1986. Pre-field studies included library research and perusal of Custer County and BLM mining and mineral lease records. Bureau of Mines, State, and other production records were searched, and pertinent data were compiled. A limestone quarry near the study area was examined to determine whether the limestone might extend into the area. In addition, areas of obvious rock alteration were checked for mining-related activities that may not have been recorded.

1/ A Wilderness Study Area is a roadless area or island that has been inventoried by the U.S. Bureau of Land Management and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act of 1976 and Section 2(c) of the Wilderness Act of 1964, (78 Stat. 891).

Eleven rock and two placer samples were taken to characterize the study area. Most rock samples were pulverized and fire-assayed for gold and silver, at detection limits of 0.005 and 0.2 oz/ton (ounce per ton) respectively, and analyzed for 40 2/ elements by semi-quantitative emission spectrography to detect unsuspected elements of possible significance. Two limestone samples were analyzed for a suite of oxides and loss on ignition (Bowen and others, 1973) to determine applicability for various uses. One sample was examined petrographically to identify rock type, alteration suite, and mineral assemblage. Placer samples were partially concentrated in the field and further concentrated on a laboratory-size Wilfley table. Resulting heavy mineral fractions were scanned with a binocular microscope to determine heavy mineral content. Concentrates were also checked for radioactivity and fluorescence. Complete analyses are on file at the Western Field Operations Center (WFOC), Spokane, WA.

ACKNOWLEDGEMENTS

Terry R. Neumann and Nancy L. Logue, of the USBM Western Field Operations Center, assisted in the field work.

GEOLOGIC SETTING

The Burnt Creek study area is on the northeastern slope of the Lost River Range, straddling the drainage divide between the Pahsimeroi River and the Little Lost River basin. Almost the entire study area is covered by basalt and latite-andesite of the Challis Volcanics, the exceptions being stream-deposited alluvium, two small areas of late-Paleozoic rocks, and very minor glacial deposits at upper elevations (Ross, 1947; and Rember and Bennett, 1979). In the vicinity of the old Dry Creek Reservoir, (fig. 2) carbonaceous, grayish-black, thin-bedded, silty argillite of the McGowan Creek Formation and fine-grained, massive, dark gray Mississippian-age limestone crop out. The same Mississippian limestone crops out along East Fork Burnt Creek (Ross, 1947; and Sandburg, 1975).

The geomorphology of east-central Idaho and southwest Montana is dominated by the northwest-trending Lost River Range, Lemhi Range and Beaverhead Mountains, and broad intermontane valleys. These ranges are structurally flat-topped, basement-core block uplifts with monoclinal drape-folded flanks (Ruppel, 1982). Right-lateral strike slip faults have broken the three ranges and given the region its characteristic pattern of mountain spurs and reentrant valleys (Ruppel, 1964; and 1967).

2/ Aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, gallium, gold, iron, lanthanum, lead, lithium, magnesium, manganese, molybdenum, nickel, niobium, palladium, phosphorus, potassium, platinum, scandium, silicon, silver, sodium, strontium, tantalum, tellurium, tin, titanium, vanadium, yttrium, zinc, and zirconium.

MINES, PROSPECTS, AND MINERALIZED AREAS

No active or historic mining claims are in or adjacent to the Burnt Creek study area. East of the area is a quarry in limestone talus that was used for sized, 100-lb rock fill in the old Dry Creek Reservoir dam. The dam was built between 1916 and 1919, and collapsed in 1956. A nearby source of sand and gravel was used for fine fill (John Mitchell, Idaho Department of Water Resources, Dam Safety Section, 1985, oral commun.), but the source of this material could not be located during the field examination.

The nearest active mines are the Clayton lead-silver mine (temporarily closed in early 1986) and the Thompson Creek molybdenum mine, approximately 40 mi and 50 mi west, respectively. About 20 mi to the east, the properties of the Little Lost River district had sporadic lead-silver production from the late 1880's to the early 1930's (Wells, 1983, p. 132). Approximately 12 lead-silver prospects and one barite prospect in Paleozoic carbonate rocks are in or near the adjacent Forest Service administered Borah Peak study area, but only minor production came from these properties (Capstick and Mayerle, 1986). Total value of mineral production from five mining districts within 35 mi of the study area is $41.1 million in silver, copper, lead, and tungsten (Wells, 1983, p. 160).

The northern half of the study area and adjacent lands to the north, northeast, and east are now or were recently under oil and gas leases (Darlene Condray, BLM, Idaho State Office, oral commun., 1985). The nearest well, 25 mi northeast, is a 6,700-ft dry well drilled by AMOCO Production Company in 1981 in the valley east of the Lemhi Range (Breckenridge, 1982). A warm spring (28°C) is about 10 mi northeast of the study area (Breckenridge and others, 1980), but no geothermal leases are in the vicinity (Darlene Condray, oral commun., 1985).

The area along East Fork Burnt Creek and at the Dry Creek Reservoir quarry has been mapped by Ross (1947) as being underlain by Brazer Limestone. He mentions that the limestone is of suitable composition for use as a component of Portland cement (Ross and Carr, 1941, p. 109). Samples from each location are shown on figure 2, analyses are in the accompanying table.

APPRAISAL OF MINERAL RESOURCES

The Burnt Creek study area has no identified mineral resources. Limestone of suitable quality for use in the manufacture of Portland cement, and nearing the quality (over 95 percent $CaCO_3$) needed for high purity uses (Danner, 1966, p. 4), was found at two locales in and near the study area. However, ample limestone outside the study area boundaries is closer to most potential markets.

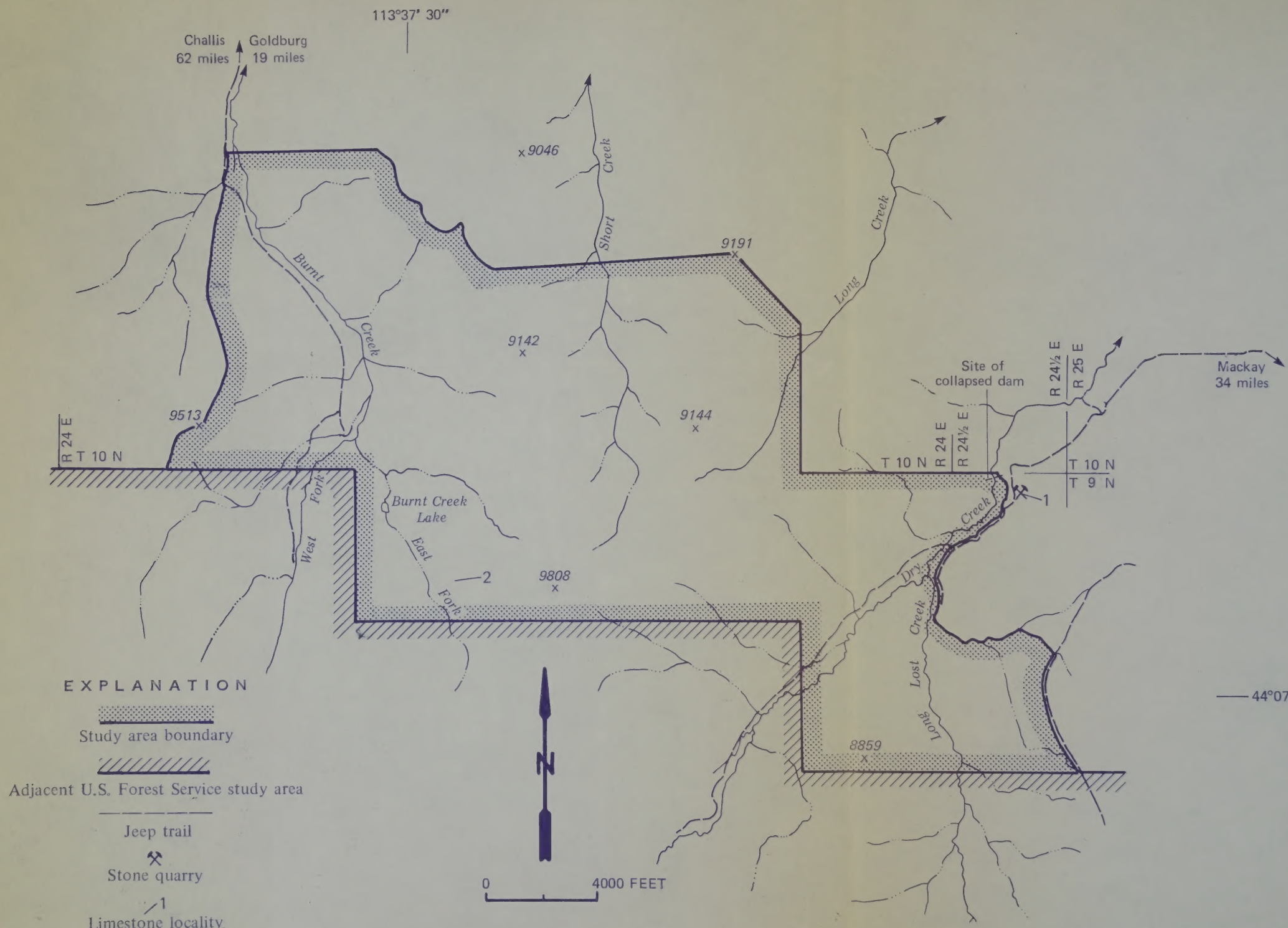

FIGURE 2. – Limestone sample localities in and adjacent to the Burnt Creek study area, Custer County, ID

An unnumbered table to accompany figure 2

Data for samples shown on figure 2 Limestone analyses

[%, percent; ppm, parts per million; <, less than shown]

Sample No.	Description	CaO (%)	LOI[1/] (%)	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	K_2O (%)	MgO (%)	MnO (ppm)	Na_2O (ppm)	P_2O_5 (ppm)	TiO_2 (ppm)	SO_3 (%)
1	Taken at quarry in coarse limestone talus - dark gray, fine-grained, crystalline limestone with some poorly preserved bryozoan and/or coral fossils on weathered surfaces----------	53.2	43.00	1.8	0.24	0.12	<0.02	0.42	41	<50	<100	200	0.32
2	Outcrop - dark gray, fine-grained, crystalline limestone with slight fetid smell when freshly broken, and some poorly preserved bryozoan and/or coral fossils on weathered surfaces---	50.7	43.09	1.9	.05	.06	<.02	.55	28	<50	<100	110	.33

1/ LOI: Loss on ignition; the loss in weight which results from heating sample to 1,000°C - includes organic material.

In July 1984, an application was submitted to the BLM to build a new dam on Dry Creek for the purpose of diverting water for irrigation and hydroelectric power production (John Mitchel, oral commun., 1985). This local construction project, and local needs to maintain gravel roads and irrigation ditches, could make resources of the stone and sand and gravel in the vicinity of the study area.

None of the rock, placer, or Department of Energy geochemical (LaDelfe, 1986) samples taken in the study area showed significant mineral values.

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